Opinion Piece

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Integrating the experience: Principles for digital transformation across the patient journey

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Abstract

As medical science advances and the population ages, the prevalence of chronic conditions has also grown. The traditional model of care, with its focus on acute and episodic issues within the office visit, is not designed to meaningfully address long-term patient needs. With COVID-19 has come unprecedented digital adoption, bringing health care delivery to a critical juncture. While digital tools and technologies present vast opportunities for democratizing and decentralizing care experiences, their piecemeal application to the existing "sick care" model and its information technology infrastructure will not only limit their value, but will inevitably add cost, inefficiency, and burden to care teams. In order to build upon this momentum and reap the full benefits of practice digitization, care model transformation must occur. This entails holistically reexamining how every component of the health care experience, from the digital tools to visit interactions, synchronizes to address the full continuum of patient needs throughout the journey. By doing this, care shifts away from one-size-fits-all, fragmented strings of visits, toward seamless experiences that adapt to patients' needs in real-time while integrating within their daily lives. Rather than acting as a substitute for care, technology instead is vital to promoting and amplifying the impact of all those involved. To achieve this, this paper outlines 10 principles for restructuring care to incorporate digital health capabilities. Each describes how all care model components work as a system that aligns with patient needs. By doing this, technology is now an integral in supporting relationships across the full continuum of care.

Keywords

digital health, ehealth, technology, telehealth, telemedicine, connected care, personalized medicine

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Within health care, digitalization has been an inevitable but slow process. As a result of the COVID-19 pandemic, health care delivery has undergone rapid-fire digitalization in order to meet new provider requirements and shift patient expectations.[1–3] This spur of necessitated innovation will reshape our approach to health care in years to come. While organizations have invested in telemedicine and telehealth over the past decade, these advancements have yet to be integrated into the care model as a seamless experience. Adoption has been fraught with barriers, such as reimbursement challenges, concerns for digital safety, and licensing concerns.[4–6] However, in light of recent events, necessity has realigned interests and reset norms for care teams, payers, and patients alike.

But simply layering digital functionality onto the current system will limit its benefits. To fully reap the advantages of digital investments we must consider how each digital offering integrates across the patient journey. By doing this, we democratize care, by enabling patients to become active, valuable participants, while the care team pivots from authoritarian expert toward a supportive partner.[7] Such a system would behave responsively to patient needs in real-time rather than reactively, offering the most appropriate resource for whom it is needed most. As a result, the emphasis on care shifts away from the brick-and-mortar clinic and instead toward patients' daily lives.

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The traditional fee-for-service model grew from an intention to resolve acute or episodic needs. However, with the progression of medical science, factors like aging and obesity have caused chronic illnesses to predominate, making the chasm between the status quo care and the needs of patients apparent. This "sick care" model is simply not designed to equip patients with the tools and skills to self-manage and thrive. Likewise, future advancements in individualized and regenerative medicine will likely result in some form of life-long management. Thus, chronic illnesses will continue to push the limits of an overly strained and costly health care system. While reimbursement models, such as value-based payment, enable a shift from chronic disease care toward chronic health care, their implementation is in its infancy and often constricted by the limitations of the fee-for-service model and bundled payment schemes.

However, embracing this new paradigm requires looking beyond well-established process improvement methodologies that focus on current state optimization, efficiency, and waste reduction. Instead, there is a need for transformative approaches that reframe experiences from the user perspective. To accomplish this, health care organizations leverage service design. At its core, this interdisciplinary competency utilizes a range of methods, such as qualitative research, prototyping, and journey mapping to form a deep understanding of the needs of patients, families, and care teams. By doing this, they co-create and iterate health care experiences that are intuitive, holistic, and meaningful.[8] In other sectors, service design plays a vital role in industry digitization, so much so that top management consultancies are investing heavily in this competency.[9] Despite this, service design in health care is still underutilized and is more often applied superficially within patient satisfaction initiatives. In order to build upon current digital transformation endeavors and truly reap its system-wide benefits, they must be given the latitude to impact care delivery itself.

For this to be possible, the following principles should be considered:

1. *The patient journey must embody long-term goals for health*: Under the current paradigm, care is delivered in an episodic format. Focusing on treatment and risk mitigation at the moment, episodic care undermines the patient's capability to cope, adapt, and thrive. Delivering longitudinal and chronic care necessitates a fundamentally different approach that positions the patient for long-term success. Doing this requires crafting a holistic vision that reflects the long-term needs and aspirations of patients and care teams. Once this is defined, it must then be reinforced throughout the entire journey, and not introduced as a new concept at the conclusion of treatment. This may require a creative thought exercise where key stakeholders position themselves into the future. For instance, asking: What do they ultimately wish for patients post-treatment? How might this experience reinforce their health goals?
2. *Accommodate fluctuating emotional and medical needs*: Medical issues are central to the traditional model and apply a rigid, disease-based approach to non-medical needs. This misappropriates attention and resources, leaving patients feeling dismissed, overwhelmed, or burdened (Figure 1, left). All the while care teams are forced to compensate on an individual basis in real-time. By understanding how patient medical and emotional needs fluctuate, the tools, resources, and interactions within the care model can respond as an integrated and supportive system (Figure 1, right).
3. *Provide a flexible, coordinated system of tools and resources*: In order to respond effectively to these fluctuating medical and emotional needs in real-time, there must be a flexible suite of capabilities. Tools and channels, such as remote self-monitoring, at-home testing, asynchronous communication, health coaching, sensing technology, and online communities, must work in synchrony to accommodate these needs. As a system, they must also provide clear paths for accessing the care team, while also enabling self-guided problem solving and discovery. Figure 2 is one example of how a suite of features can coordinate across these dimensions.
4. *Provide opportunities to participate*: Recently, there has been a deluge of remote self-monitoring technology within the health care marketplace, where devices are becoming increasingly portable, precise, affordable, and easy to use. As a result, care teams can be more responsive than ever to the patients' fluctuating status and risk within their daily lives. However, to achieve the desired outcome, one must look beyond solely the clinical value of this data. When designed well, this exchange can enable patients to meaningfully contribute to their care as active partners, building self-awareness, insight, and expertise on how their conditions fit within their daily lives. By doing this, they can take more full advantage of the ecosystem of self-directed and care team-assisted support described above.
5. *Build relationships and continuity throughout the experience, not just during visits*: In order not to revert to visits as default for meeting patient needs, it is essential that patients perceive frictionless access to, not only their care teams, but also the answers they seek. If they sense barriers, whether due to poorly designed tools or excessive system workarounds, this will erode trust. This will lead even the most confident patients to rely on in-person visits as a safety net. Because of this, it is important that

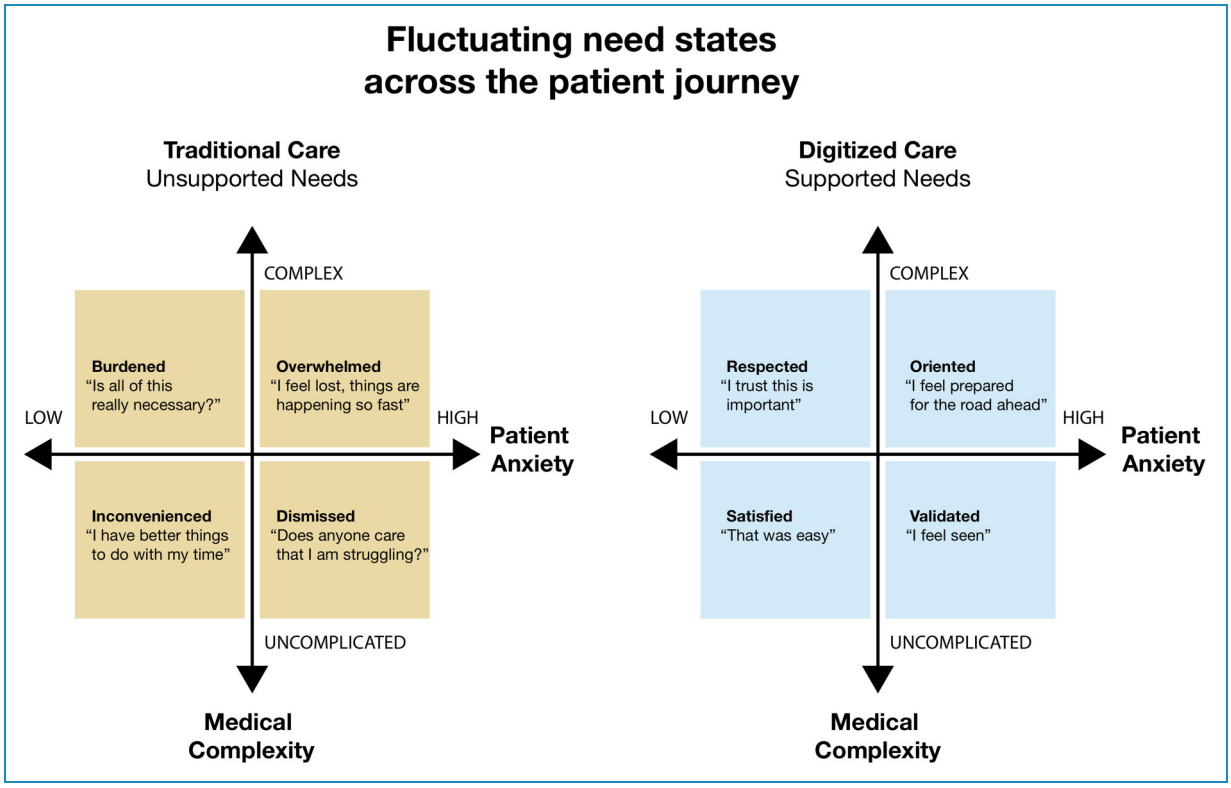

Figure 1. The matrices compare the fluctuating need states of patients based on whether that need is unsupported (left) or supported (right). Each quadrant includes an example of the resulting emotional state.

patients feel known and visible to their care teams throughout their experience, and not just during their appointments. Additionally, many patients will appreciate face-to-face contact at some point within their journey. They should never feel discouraged from this, as it will only erode trust in the support system. Therefore, organizations should exercise caution when emphasizing metrics such as reduced or converted clinic visits.

6. *Create the opportunity for meaningful patient contribution and peer connection*: With increasing digitalization, the care experience is moving beyond mere 1:1 patient–provider interactions, with online communities, group care, patient-generated educational content, and patient mentorship programs being increasingly more common. Such tools empower patients by leveraging their expertise and contributing knowledge as capable and respected partners in the health care experience. But too often, these tools and patient-to-patient interactions are undervalued in their capacity to provide continuity, connection, and support. When these are not meaningfully incorporated within the integrated care experience, they are left to feel superfluous and will therefore fail to deliver their full value.
7. *Shift from transactional contact toward bi-directional partnerships*: Throughout the experience, it is crucial to establish a dynamic where patients are not always "pulling" what they need from the system—or having a problem necessitating contact. Communication channels should be bi-directional and proactive. For example, care teams might check in with patients and deliver timely coaching or educational content during anticipated moments of struggle. Alternatively, patients may be encouraged to contribute to non-medical topics of interest within an online community. All of this serves to lower the threshold for contact, therefore creating an open door for patients to address concerns sooner.
8. *Establish patient orientation*: The traditional episodic care experience, designed to address acute medical needs, commonly results in a disorienting and overwhelming sequence of interactions for patients, such as visits, imaging, labs, and tests. By not understanding how one event connects to another, patients must let go of control and submit themselves as passengers within the process. This ultimately contradicts any efforts to incorporate the above principles. By illuminating what to expect across the journey, patients now have a foothold for resuming greater control.
9. *Change the role of the care team*: For these models to flourish, all members of the care team must have the flexibility to execute a range of activities, such as practice enhancements, patient communication, and data

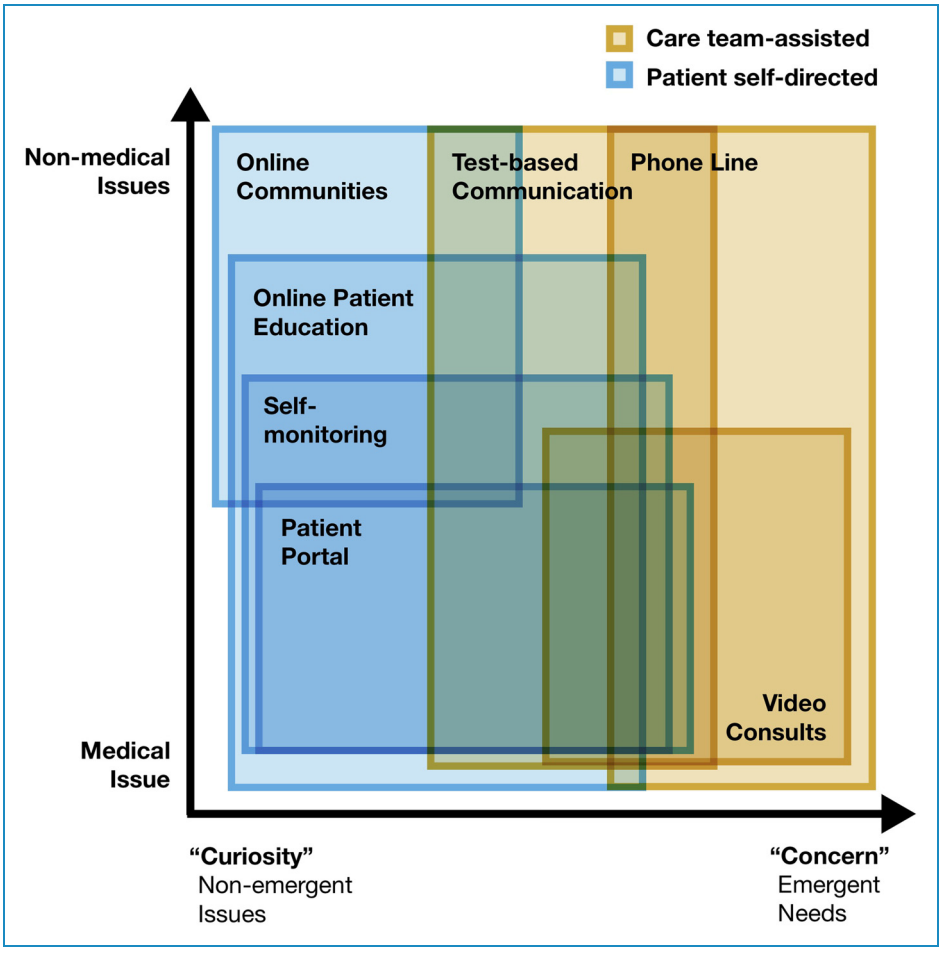

Figure 2. Sustaining a continuous connection with patients requires that digital tools and in-person offerings work in synchrony across a full spectrum of needs, offering channels for care team contact and self-guided problem-solving. This image is an example of how digital capabilities might coordinate to achieve this.

interpretation, along with content creation and maintenance. Care team roles will evolve past rigid 1:1 interactions and repetitive care delivery tasks toward instead enhancing the scope, reach, impact, and integration of their practice within the community. Inevitably, as less essential visits are replaced with other resources, those that remain will be more emotionally and intellectually demanding. This increased load must be accounted for, which means resisting knee-jerk urges to fill calendars with more patient visits as appointment slots become available. This requires reconsidering traditional productivity and efficiency metrics.

10. *Technology infrastructure must support patient relationships across cohorts*: Just as technology enables care model transformation, we must also be conscious of its obstructive qualities. The technology in use today, particularly the electronic health record (EHR), was originally designed to optimize office visits within the fee-for-service paradigm. While several issues stem from this, one being poor integration between existing information technology (IT) infrastructure and digital health functionality, perhaps most egregious is the coupling of patient information with system contact. In other words, a patient must initiates contact, whether through a visit or non-visit interaction, to remain visible to the care team. While panel and customer relationship management systems mitigate this issue, they often are not fully integrated within workflows and are not used across the full multidisciplinary care team. As a result, care teams face burdensome workarounds to prevent patients from "falling through the cracks." For care experiences to become location-agnostic and proactive, they must have access to clinical IT systems that provide a line of sight into patient cohorts across the full continuum of care. By doing this, patients are visible regardless of contact and care teams can work strategically, focusing effort and attention beyond the individual interaction.

Table 1. Provides two contrasting examples of how these principles can be applied: one across a single care pathway the other across multiple, integrated care pathways.

Principle	Mayo Clinic OB Nest "Single care pathway"	Iora Health "System, or multiple care pathways"
The patient journey must embody long-term care goals.	Aims to "de-medicalize" the low-risk prenatal care by providing an empowering wellness experience, where expectant parents are given the tools to actively participate in their care.	Aims to deliver whole-person care by nurturing long-term relationships.
Accommodate fluctuating emotional and medical needs.	Restructures care interactions and communication channels to provide support specifically during early pregnancy where reassurance is often needed most.	Behavioral specialists and health coaches are fully integrated within the multidisciplinary care team in order to address the full continuum of patient needs.
Provide a flexible, coordinated system of tools and resources.	Self-monitoring tools, text-based communication, patient online communities, patient portal, and phone line work in synchrony to address medical and non-medical needs while providing care team-assisted and self-guided channels for support.	Video visits, peer support groups, health coaches, behavioral health specialists, text-based communication, and a digital portal work in synchrony to provide patients with a matrix of self-guided and care team-assisted support.
Foster relationships and continuity throughout the whole experience, not just visits.	Early within the pregnancy, parents' first interactions are with a nurse who then serves as their primary point of contact throughout the pregnancy. They are encouraged to communicate through the patient portal.	Each patient is given a dedicated advocate within the care team. Their digital portal offers frictionless text-based and video channels to communicate.
Provide tools and resources for patients to actively participate.	At 12 weeks, expectant parents are given the tools and instructions to begin weekly self-monitoring of blood pressure, weight, and fetal heart rate	Patients are given access to a digital portal where they can easily access their health data and medical history.
Create the opportunity for meaningful patient contribution and peer connection.	Patients are empowered to build and share expertise patient online communities. Self-monitoring provides meaningful engagement opportunities for family and support people.	Patients can participate in peer groups and online communities, as well as contribute their own comments within the clinical note.
Shift from transactional toward bi-directional contact.	Proactive communication occurs throughout pregnancy at key milestones. Online communities also offer additional space for low-threshold bi-directional communication.	Embodies this within their organizational mission through building an experience where patients are cared for not only when they are sick, but also when they are well.
Foster transparency across the journey	The pregnancy care and its milestones are visualized and communicated to patients when care is initiated.	Patient-facing digital tools enable patients to prepare for upcoming appointments
Consider the changing role of the provider.	The nurses report greater autonomy and stronger relationships, which allowed them to work toward a more full scope of practice.[12]	Providers are not held accountable for volume or efficiency metrics and therefore are given the flexibility and empowerment to do what is necessary to meet patient needs. Additionally, community outreach is encouraged
Technology must support relationships.	Care teams use care coordination software to	Their proprietary electronic health record (EHR) system is specially designed to support

(continued)

Table 1. Continued.

Principle	Mayo Clinic OB Nest "Single care pathway"	Iora Health "System, or multiple care pathways"
	manage their patient panels and know where each patient is within their journey.[13]	longitudinal relationships across patient cohorts, rather than maximize billing practices. Information about patients is tethered to their specific issues, not their most recent interaction. Data from external sources are leveraged to deliver population-level care.[11,16]

How an organization accomplishes these objectives can vary widely. What works for one clinic and population may not be realistic elsewhere. Therefore bringing them to life requires a deep understanding of context and continuous iteration. Table 1 provides two contrasting examples of how these principles can be applied: one across a single care pathway the other across multiple, integrated care pathways. Mayo Clinic's OB Nest program seeks to "de-medicalize" the low-risk pregnancy care experience by empowering expectant parents throughout pregnancy.[10] To accomplish this, they built an ecosystem of self-directed and care team-assisted resources to meet the full continuum of emotional and medical needs across the journey. Iora Health is a primary care organization primarily serving Medicare patients, spanning a range of conditions. In order to achieve meet patient needs at a lower cost, they leverage digital technology to re-envision health care delivery entirely.[11] Both have demonstrated improvements within the quadruple aim by integrating practice changes and technology as a system.[12–15]

Ideally in the future, once digitization reaches maturity, the system will be capable of anticipating patient needs. The data generated through patient participation will be a powerful ingredient driving this. And while this data certainly risks exploitation by other parties, when leveraged properly and ethically, it has the potential to benefit most of the patients who provided it. The data exchanged between an integrated suite of tools and technology will serve as connective tissue between patients, communities, and care teams, providing not only new ways for care teams to interact with patients, but also for patients and communities to care for one another. This rich network of feedback loops holds the potential to enable health care to meaningfully address social determinants of health. However, this requires pushing beyond piecemeal application of digital features and instead leveraging these capabilities to combat fragmentation, marginalization, and reductivism. Idealistically, as we look beyond this paradigm, technology should be a driving force that unleashes system-wide human potential to realign health care with health creation.

Moving forward, while COVID-19 has brought upon changes to various state-based licensure requirements, billing, and documentation requirements, hopefully, this will shed light on how to design more flexible and realistic future policies. This moment in time represents a critical juncture for breaking beyond the fee-for-service mold. However, if we are to continue building upon this momentum, we must think beyond digitization as a goal in itself, and instead drive toward the transformation it unlocks.

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References

1. Sparks D. Navigating the new world of COVID-19 with virtual appointments. Mayo Clinic News Network. https://newsnetwork.mayoclinic.org/discussion/navigating-the-new-world-of-covid-19-with-virtual-appointments/ (2020, accessed April 9, 2020)
2. Robbins T, Hudson S, Ray P, et al. COVID-19: A new digital Dawn? *Digital Heal* 2020; 6: 205520762092008.
3. Rizzi AM, Polachek WS, Dulas M, et al. The new 'normal': Rapid adoption of telemedicine in orthopaedics during the

COVID-19 pandemic. *Injury*. 2020 Dec;51(12):2816–2821. doi: 10.1016/j.injury.2020.09.009.
4. Kruse CS, Karem P, Shifflett K, et al. Evaluating barriers to adopting telemedicine worldwide: A systematic review. *J Telemed Telecare* 2016; 24: 4–12.
5. Foster M and Sethares K. Facilitators and barriers to the adoption of telehealth in older adults. *Comput Inform Nurs* 2014; 32: 523–533.
6. Telehealth in health centers: Key adoption factors, barriers, and opportunities. Undefined.
7. Stickdorn M, Hormess M, Lawrence A, et al. *This is service design doing: Applying service design thinking in the real world: A Practitioners' handbook*. Sebastopol, CA: O'Reilly Media, Incorporated, 2018. https://books.google.nl/books?id=tb84jgEACAAJ
8. Roth C. The role of service design in healthcare inclusivity and digital health part 2. https://uxdesign.cc/the-role-of-service-design-in-healthcare-3e3ee29a2494 (2019, accessed April 9, 2020)
9. Sheppard B, Kouyoumjian G, Sarrazin H, et al. The business value of design. McKinsey & Company. https://www.mckinsey.com/business-functions/mckinsey-design/our-insights/the-business-value-of-design (2018, accessed July 4, 2020).
10. Mooij MJM de, Hodny RL, O'Neil DA, et al. OB Nest: Reimagining low-risk prenatal care. *Mayo Clin Proc* 2018; 93: 458–466.
11. Iora Health. Our model. Iora Health. https://www.iorahealth.com/model/ (2020, accesed April 9, 2020)
12. Baron AM, Ridgeway JL, Stirn SL, et al. Increasing the connectivity and autonomy of RNs with low-risk obstetric patients. *Am J Nurs* 2018; 118: 48–55.
13. Tobah YSB, LeBlanc A, Branda ME, et al. Randomized comparison of a reduced-visit prenatal care model enhanced with remote monitoring. *Am J Obstet Gynecol* 2019; 221: 638.e1–638.e8.
14. Iora Health. Real results. Iora Health Website. https://www.iorahealth.com/real-results/ (2020, accessed July 4, 2020)
15. Bodenheimer T and Sinsky C. From triple to quadruple aim: Care of the patient requires care of the provider. *Ann Fam Med* 2014; 12: 573–576.
16. Schutzbank A and Fernandopulle R. Doubling down: Lessons learned from building a new electronic health record as part of primary care practice redesign. *Healthcare* 2014; 2: 14–18.